

REMARKS

Enclosed herewith is a Substitute Specification in which the specification as filed has been amended in various places to correct typographical and grammatical errors, and also to add section headings. In addition the specification as filed has been amended to add a brief description of new Fig. 2 and to further describe new Fig. 2 at page 7, lines 6-9 of the specification as filed.

In support of the above, enclosed herewith is a copy of the specification as filed marked up with the above changes.

The undersigned attorney asserts that no new matter has been incorporated into the Substitute Specification.

The claims have been amended to more clearly define the invention as disclosed in the written description. In particular, claims 1, 2, 6, 10, 11 and 15 have been cancelled (claim 13 having been previously cancelled). Claim 3 has been made proper independent claim and includes the limitations of cancelled claims 1 and 2, while claim 5 has been made dependent on claim 3. Furthermore, claims 7 and 9 have each been made proper independent claims and include the limitations of cancelled claim 1, and claim 15 has been made an independent claim and includes the limitations of claim 14. In addition, claims 12 and 16 have been amended to include the limitations of claims 2 and 3. Finally, the claims have been amended for clarity.

The limitations of claim 9 find support in the specification as filed on page 7, lines 6-9. In addition, new Fig. 2 now shows the limitations of claim 9.

Applicant believes that the above changes answer the Examiner's 35 U.S.C. 112, paragraphs 1 and 2, rejections of the claims, and respectfully requests withdrawal thereof.

The Examiner has rejected claims 1, 2, 5, 6 and 10-16 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,402,124 to Todd et al. The Examiner has further rejected claim 3 under 35 U.S.C. 103(a) as being unpatentable over Todd et al. in view of U.S. Patent 5,946,652 to Heddle. In addition, the Examiner has rejected claims 7 and 9 under 35 U.S.C. 103(a) as being unpatentable over Todd et al. in view of U.S. Patent 5,774,842 to Nishio et al.

Applicant acknowledges that the Examiner has found claims 4 and 8 allowable over the prior art of record.

The Todd et al. patent discloses encoder and decoder with improved quantizer using reserved quantizer level for small amplitude signals, in which a ditherer 110 adds a dither component to a filtered digital signal, the dither component being produced by a pseudo-random number generator, and a quantizer 112 for quantizing the output from the ditherer 110 (see Fig. 10). Todd et al. further discloses a decoder in which an encoded signal is

applied to a dequantizer 208, a ditherer 210 and an inverse filter bank 212 in order to recover the input signal.

The subject invention, as claimed in claim 15, includes a quantization element 14 for forming a decoded signal, a noise source 16 and a subtraction element for subtracting a noise signal from the decoded signal.

However, Applicant submits that Todd et al. neither shows nor suggests that the non-linear device parameters and the noise parameters are retrieved from a record carrier on which the reduced word-length signal is recorded, and that the quantization element uses the non-linear device parameters to adjust its transfer function such that it is the inverse to that used to form the reduced word-length signal, and that the noise source uses the noise parameters to adjust its functions such that its output noise corresponds to the noise used to form the reduced word-length signal.

With regard to the quantizer 112, Todd et al. states "The output of the quantizer shown in FIG. 9c shows that the 'small zero' quantization level may be reserved only for signals having a small amplitude and does not necessarily apply to portions of larger amplitude signals at or near their zero crossings." (col. 7, lines 27-32).

The Heddle patent discloses methods for non-linearly quantizing and non-linearly dequantizing an information signal using off-center decision levels.

In the subject invention, as claimed in claims 3, 12 and 16, "the gain of the non-linear transfer function being substantially equal to one for small amplitudes, and the gain decreasing for large amplitudes".

The Examiner now states that "Todd does not explicitly specify the gain of the quantizing function. However, Heddle shows the quantizing function in FIG. 4, FIG. 5 and column 3, lines 20-25. As Todd teaches the non-linearly quantizing and dequantizing small amplitude signals, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to adopt the well known quantizing function that the small amplitude signal has the gain substantially equaling to unit and the larger amplitude signal having decreasing gain (as shown in the FIG. 4 and FIG. 5 of Heddle)...."

Applicant submits that the Examiner's characterization of Heddle is erroneous. In particular, neither Fig. 4 nor Fig. 5 show the gain for small amplitude signals being substantially equal to one, while the gain decreases for larger amplitude signals. In fact, with regard to Fig. 4, the gain for small amplitude signals is significantly larger than one until the input signal achieves the signal level "a", at which the gain is one, and after which the

gain decreases. In Fig. 5, the gain for small amplitude signals is significantly smaller than one until the input q achieves the signal level 1.0 at which the gain is approximately one, and after which, the gain increases. Heddle, at col. 3, lines 21-24, states (with regard to Fig. 5) "Since, in this example, the slope of the non-linear function $f(x)$ is greater for data values near zero than for data values near 1.0 and -1.0, the non-linear quantizing scheme shown is more precise for small data values."

Applicant submits that from the above, it should be clear that the combination of Todd et al. and Heddle neither shows nor suggests that the gain of the transfer function being equal to one for small amplitudes, and the gain decreasing for larger amplitudes.

The Nishio et al. patent discloses noise reduction method and apparatus utilizing filtering of a dithered signal, in which, as noted by the Examiner, the encoded dithered signal is recorded on a recording medium such as a compact disc (CD).

The subject invention, as claimed in claim 7, includes "recording the reduced word-length signal, the non-linear device parameters and the noise parameters on a recording medium."

Applicant therefore submits that while the combination of Todd et al. and Nishio et al. discloses recording the encoded dithered signal (i.e., the reduced word-length signal) on a recording medium, this combination neither discloses or suggests

also recording the parameters of the non-linear device and the noise parameters on the recording medium.


With regard to claim 9, instead of the reduced word-length signal, a difference signal, formed by subtracting the reduced word-length signal from the intermediate signal, is recorded on the recording medium along with the parameters of the non-linear device and the noise parameters.

Applicant submits that while Nishio et al. arguably discloses the forming of the difference signal by the adder 12 in Fig. 8, the combination of Todd et al. and Nishio et al. neither discloses nor suggests recording this difference signal on the recording medium along with the parameters of the non-linear device and the noise parameters.

In view of the above, Applicant believes that the subject invention, as claimed, is neither anticipated nor rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover.

Applicant believes that this application, containing claims 3-5, 7-9, 12 and 16, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

by 
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CERTIFICATE OF MAILING

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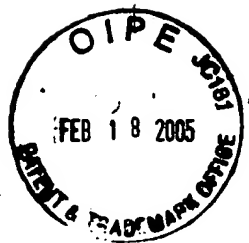
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On February 16, 2005
By Burnett James

IN THE DRAWINGS

Applicant proposes to amend the figure in the drawing in accordance with the accompanying ANNOTATED SHEET SHOWING CHANGES. Also enclosed is a REPLACEMENT SHEET incorporating the above changes.

In addition, enclosed herewith is a new drawing sheet containing new Fig. 2.



ANNOTATED SHEET SHOWING CHANGES

~~1/1~~ 1/2

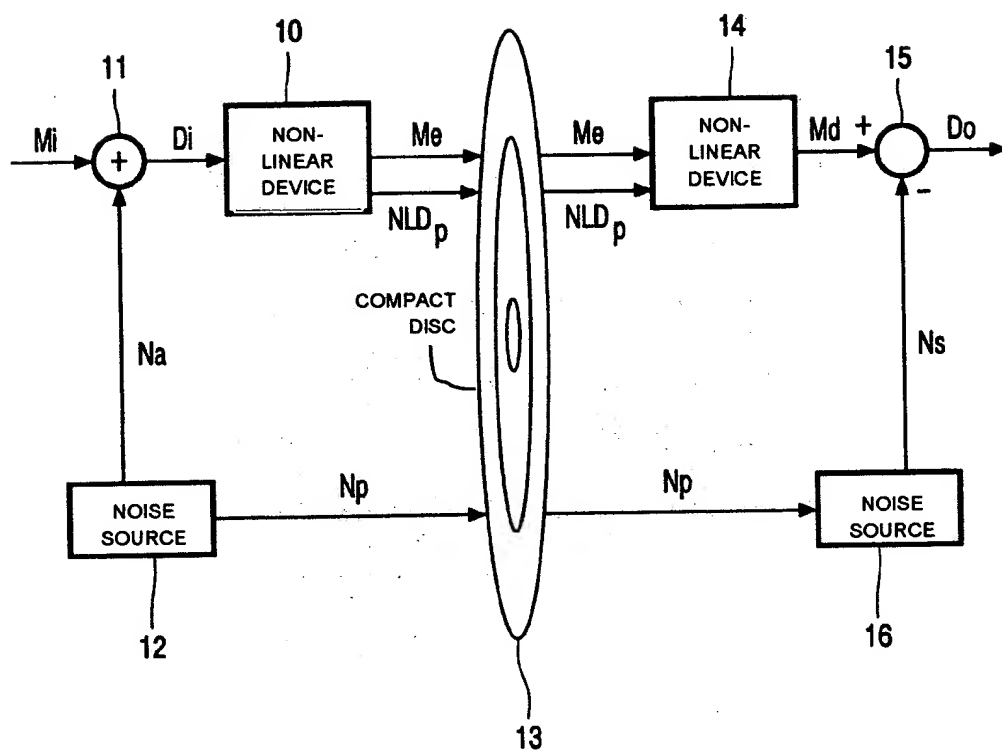


FIG. 1